

# LAWRENCE LIVERMORE REPORT

A weekly collection of scientific and technological achievements from Lawrence Livermore National Laboratory, June 25-July 2, 2010

**A scientist walks into the public arena**



**Tom Issacs**

Scientific advances often provoke deep concern on the part of the public, especially when these advances challenge strongly held political or moral perspectives.

An American Academy of Arts and Sciences' project on Improving the Scientific Community's Understanding of Public Concerns about Science and Technology examined the ways in which scientists engage with the public, and how their mutual understanding could be improved.

More than 50 scientists, engineers, public policy experts, lawyers, ethicists and journalists participated in a series of workshops that focused on four areas of public concern: the siting of nuclear waste repositories; the spread of personal genetic information; the next generation of the Internet; and the risks and benefits of emerging energy technologies.

Tom Issacs, the former director for the Lab's Office of Planning and Special Studies at LLNL and a lead adviser to the Blue Ribbon Commission (BRC) on America's Nuclear Future, was part of that panel of experts.

To learn more about the findings, go to [http://www.washingtonpost.com/wp-dyn/content/article/2010/06/25/AR2010062502158\\_2.html](http://www.washingtonpost.com/wp-dyn/content/article/2010/06/25/AR2010062502158_2.html)

**Can you see it?**



**Making adjustments to the dynamic transmission electron microscope.**

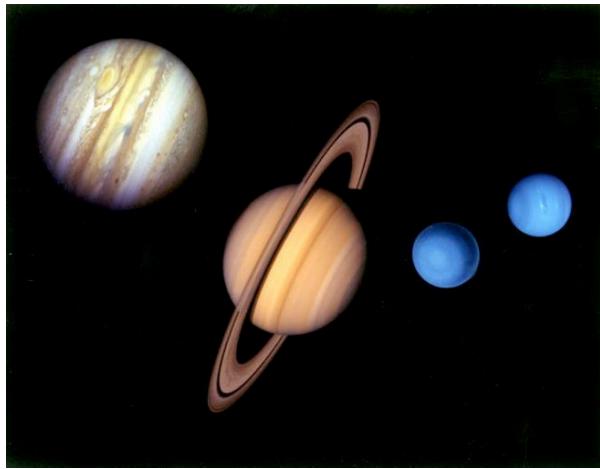
Scientists can now peer into the inner workings of catalyst nanoparticles 3,000 times smaller than a human hair within nanoseconds.

The findings point the way toward future work that could greatly improve catalyst efficiency in a variety of processes that are crucial to the world's energy security, such as petroleum catalysis and catalyst-based nanomaterial growth for next-generation rechargeable batteries. Lawrence Livermore and the University of California at Davis performed the work in a collaborative effort.

Using a new imaging technique on the Laboratory's Dynamic Transmission Electron Microscope (DTEM), researchers have achieved unprecedented spatial and temporal resolution in single-shot images of nanoparticulate catalysts.

To read more, go to <http://www.rdmag.com/News/2010/06/General-Science-Microscopy-Peering-Into-The-Inner-Workings-Of-Catalyst-Nanoparticles/>

**Uncovering phases of hydrogen**



**The gas giants of our solar system: from left, Jupiter, Saturn, Uranus and Neptune.**

Hydrogen is the most abundant element in the universe and is a major component of giant planets such as Jupiter and Saturn.

But not much is known about what happens to this element under high-pressure conditions when it transforms from one state to another.

Using quantum simulations, scientists at the Laboratory, the University of Illinois at Urbana-Champaign and the University of L'Aquila in Italy were able to uncover these phase transitions in the laboratory similar to how they would occur in the centers of giant planets. They discovered a first order phase transition in liquid hydrogen between a molecular state with low conductivity and a highly conductive atomic state. The critical point of the transition occurs at high temperatures, near 3100 degrees Fahrenheit and more than 1 million atmospheres of pressure.

"This research sheds light on the properties of this ubiquitous element and may aid in efforts to understand the formation of planets," said LLNL's Eric Schwegler.

To read more, go to [https://newsline.llnl.gov/\\_rev02/articles/2010/jun/06.25.10-hydrogen.php](https://newsline.llnl.gov/_rev02/articles/2010/jun/06.25.10-hydrogen.php)

**LIFE in the fast lane**



The Lab's Ed Moses recently conducted a presentation for ForaTV on how the National Ignition Facility is a proving ground for creating a limitless source of carbon-free energy.

Moses says energy production is a global challenge. To meet future energy demands, the world must build the equivalent of 20 gigawatts per week, he said.

Fusion energy may be the answer. NIF will be used to demonstrate fusion turning laser light into X-rays, which drive into a hydrogen target and then fusion occurs. The goal is to get more energy out than what goes in.

"If we can do that, we can change the world," Moses said.

To see the video, go to [http://www.youtube.com/watch?v=AkEgqiWBR-0&feature=player\\_embedded](http://www.youtube.com/watch?v=AkEgqiWBR-0&feature=player_embedded)

#### **Latest Newsline available**



*Newsline* provides the latest Lab research and operations news. See the most recent issue at <https://newsline.llnl.gov>

---

LLNL applies and advances science and technology to help ensure national security and global stability. Through multi-disciplinary research and development, with

particular expertise in high-energy-density physics, laser science, high-performance computing and science/engineering at the nanometer/subpicosecond scale, LLNL innovations improve security, meet energy and environmental needs and strengthen U.S. economic competitiveness. The Laboratory also partners with other research institutions, universities and industry to bring the full weight of the nation's science and technology community to bear on solving problems of national importance.

To send input to the Livermore Lab Report, send e-mail <mailto:labreport@llnl.gov>.

The *Livermore Lab Report* archive is available at:

[https://publicaffairs.llnl.gov/news/lab\\_report/2010index.html](https://publicaffairs.llnl.gov/news/lab_report/2010index.html)